HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Puyallup Tribes' Puyallup Acclimation Sites
Species or Hatchery Stock:	Fall Coho, Voights Creek Stock
Agency/Operator:	Puyallup Tribe of Indians
Watershed and Region:	Puyallup River/ WRIA 10
Date Submitted:	March 10, 2003
Date Last Updated:	March 10, 2003

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Voights Creek Hatchery, Electron Acclimation Ponds

1.2) Species and population (or stock) under propagation, and ESA status.

Fall Coho, *Oncorhynchus ktsutch,* Not listed

1.3) Responsible organization and individuals

Indicate lead contact and on-site operations staff lead.
Name (and title): Blake Smith, Enhancement Chief
Agency or Tribe: Puyallup Indian Tribe
Address:

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

Washington Department of Fish and Wildlife (WDFW), are responsible for the operation of the Voights Creek Hatchery where broodstock collection occurs.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Funding sources:	Puyallup Tribe/BIA
Staffing level:	2 full time/1 part time
Annual hatchery program operational costs:	~$45,000

1.5) **Location(s) of hatchery and associated facilities**.

Rushingwater Acclimation Pond – Pond is located at River Mile 0.5 on Rushingwater Creek (10.0625) that is a Left Bank tributary at River Mile 1.1 on the Mowich River (10.0624).

Mowich River Acclimation Pond – Pond is located at River Mile 0.2 on the Mowich River

(10.0624).

Cowskull Creek Acclimation Pond – Pond is located at River Mile 0.1 on Cowskull Creek (10.0680) that is a Left Bank tributary to the Puyallup River (10.0021) at River Mile 44.8.

1.6) Type of program.

Integrated Recovery

1.7) Purpose (Goal) of program.

The Puyallup Tribes' Fall Coho program is for restoration purposes.

1.8) Justification for the program.

The integrated recovery program initial rearing is at Voights Creek Hatchery then imprinted and released out of the acclimation ponds located in the Upper Puyallup River above Electron Dam. Fifty percent of the coho are CWT and 100 percent externally marked with an adipose clip at time of release. Adult coho salmon have been blocked from migrating above Electron Dam for 96 years. This program is to reestablish a viable coho salmon run above Electron Dam in the 30 miles of usable salmonid habitat. Currently a fish ladder is being built on Electron Dam and should be completed by the fall of 2000.

1.9) List of program "Performance Standards".

Integrated Recovery

Program Goal:
Artificially propagated fish will increase the abundance of an existing wild population or reestablish natural spawning populations in areas where they have been extirpated.

Justification:
Benefits:
- Increase the total abundance of the composite natural/hatchery population
- Result in an increasing trend of Natural Origin Recruits (NORs).

Goal (Section 1.7-1.8)	**Performance Standard** (Section 1.9)	**Performance Indicator** (Section 1.10)	**Monitoring requirements**

Goal (Section 1.7-1.8)	**Performance Standard** (Section 1.9)	**Performance Indicator** (Section 1.10)	**Monitoring requirements**
Increase the total abundance of composite natural/hatchery population	The abundance of spawning fish increases to escapement goal set by Management Plan	Estimate spawning abundance of natural spawner	Requires spawning ground survey or other method of estimating escapement. Currently, there is an adult fish trap at Electron Dam that will enumerate the number of adult coho migrating above the dam.
Increasing trend of NORs	The number NOR fish in the naturally spawning population increases	Estimate abundance of NOR coho returning to river	Requires escapement estimate and sampling for a unique hatchery mark. Hatchery mark or tag required to separate hatchery spawners from NOR.
	The return per spawner for naturally spawning fish (NRR) remains above replacement level	Estimate return per spawner for natural spawning fish (NRR).	Requires escapement estimate and sampling for a unique hatchery mark. Hatchery mark or tag required to separate hatchery spawners from NOR.
Maintain the total abundance of composite natural/hatchery population	The abundance of returning fish provides the broodstock set by Management Plan	The broodstock collected meets the goals set by Hatchery management plan.	

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

See 1.9)

1.11) Expected size of program.

Expected size of program is 200,000 yearling smolts destined for the Upper Puyallup River acclimation ponds.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

All broodstock are collected at the Voights Creek Hatchery operated by the Washington Department of Fish and Wildlife located on Voights Creek (10.0141) a Left Bank tributary to the Carbon River (10.0413) at River Mile 4.0.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2).

Life Stage	Release Location	Annual Release Level
Yearling	Acclimation Ponds	200,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Estimated smolt to adult survival information from PSMFC is given in the following table for fingerling releases at Upper Puyallup River acclimation ponds:

Tagcode	BrYr	Date.Rel	Release Site	**% Survival**
63-09-12	1998	19-May-00	10.0625	N/A
63-62-14	1997	25-May-99	10.0625	N/A
63-62-15	1997	22-Apr-99	10.0624	N/A
63-05-56	1996	9-Apr-98	Cow Skull Cr.	0.09
63-05-55	1996	9-Apr-98	Cow Skull Cr.	0.13

Source:
http://www.rmis.org
or
http://www.nwifc.wa.gov/CRAS

Adults counted and hauled upstream by Puyallup Tribal Fisheries using beach seine techniques at the base of Electron Dam:

Date	**Species**	**Male**	**Female**	**Jacks**
13-Oct-99	Coho	2	1	0
21-Oct-99	Coho	0	4	0

(Blake Smith pers. comm.)

Electron fish ladder became fully operational in August of 2000.

1.13) Date program started (years in operation), or is expected to start.

The first acclimation pond releases for yearling coho in the Upper Puyallup River started on April 09, 1998 as part of a Resource Enhancement Agreement between Puget Sound Energy and Puyallup Tribe of Indians.

1.14) Expected duration of program.

The Upper Puyallup Acclimation Pond Program expects to operate until an interim escapement goal 2000 adult coho are passed above Electron Dam 3 out of 4 years.

1.15) Watersheds targeted by program.

Acclimation coho releases are targeting the Upper Puyallup River Watershed (Above River Mile 31.2) including The North (10.0699) and South Forks (10.0021) of the Puyallup River, Mowich River (10.0624), Meadow Creek (10.0630), Deer Creek (10.0685), Rushingwater Creek (10.0625), LeDout Creek (10.0620), Neisson Creek (10.0622), Kellog Creek (10.0621), and all tributaries associated with the Puyallup River system.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

Currently no other actions are being considered to obtain program goals.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

Currently developing HGMP that will be used to develop 4 (d) rule under ESA.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

Take actions for this program are difficult to quantify. Broodstock is not captured at Diru Creek Hatchery nor is the hatchery program engaged directly with smolt trapping.

White River Spring chinook (threatened) also exist in the Puyallup River basin. The level of take of this stock directly associated with the Puyallup Tribe's coho acclimation program is not available.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

Dendrogram: South Prairie population, Attachment 1 (WDFW et al. 2000).
Puyallup River Natural Spawning Escapements, Attachment 2 (WDFW et al. 2000).
Puyallup River Natural Fall Chinook Carcass Sampling Summary Attachment 3 (WDFW et al. 2000).
Natural Puyallup River Fall Chinook- Fork Length (cm) by Age, 1992-1997 Attachment 4 (WDFW et al. 2000).

"In general, Puyallup River fall chinook enter the river in from early June through October, with the peak migration in mid-to late August. Natural spawning begins in early September and is completed by early November, peaking in late September to early October. Typical of most Puget Sound summer/fall chinook stocks, Puyallup River fall chinook juveniles out-migrate as subyearlings. The majority of returning adults spawn as 4 yr-olds, with a lesser contribution of 3 year-olds. There are returns of age 2 and 5 year-old spawners, but they form a very small portion of the total spawning population (WDFW et al. 2000).

No evidence was available to suggest differential run timing between hatchery (Voights Creek) stock and the naturally spawning population(s) in Puyallup basin.

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- **Identify the ESA-listed population(s) that will be directly affected by the program.**

Refer to Section 3.5.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

Puget Sound Chinook, threatened:

Naturally spawning population primarily within South Pairie Creek, however the extent of genetic similarity between hatchery stock and South Pairie Creek naturally spawners needs further examination. GSI samples have been collected within the two groups but analysis is pending on fund availability.

White River Spring Chinook: Hatchery stock and wild origin fish released above Puget Sound Energies Diversion Dam are considered part of Puget Sound ESU.

Bull trout, threatened. The extent to which bull trout are affected is unknown.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- **Describe the status of the listed natural population(s) relative to "critical" and**

"viable" population thresholds

Tertiary evidence suggests increasing abundance of the natural escapement for fall chinook in the Puyallup Basin over the last ten years, Attachment 2. (WDFW et al. 2000)*draft

- **Provide the most recent 12-year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

Data not available

- **Provide the most recent 12-year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.**

Puyallup River Natural Spawning Escapements, Attachment 2.

- **Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

Data not available

2.2.3) **Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take**

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Broodstock collection directed at fall chinook and coho salmon has a potential to take listed fall chinook salmon through migrational delay, capture, handling, and upstream release, during trap operation at Voights Creek Hatchery between dates, July 15th through February 15th. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation.

- **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

Puget Sound chinook, listed March 1999. Voights Creek broodstocking efforts could include

take of listed fish in the fall of 1999 and thereafter. Beginning with brood year 1999 all origin hatchery fish will be visually marked with adipose-clip. Beginning in 2002, 3 year-old returns will be able to be partitioned by origin.

- **Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

Not applicable. Broodstock not collected at Diru Creek, smolt trapping will occur in the lower Puyallup River at RM 10.5, but is not directly associated with the operation of the Diru Creek Hatchery program.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

Not applicable

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

Currently the Puget Sound ESU-wide hatchery plan is being developed.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

The program is run in accordance with the Puget Sound Salmon Management Plan developed under the U.S. v. Washington framework.

The Puyallup Tribe entered into a Resource Enhancement Agreement (REA) with Puget Sound Energy (PSE) in 1997. Through the agreement funds are allocated to begin fish restoration efforts. The Electron Fish Ladder became operational in August of 2000.

The agreement also stipulates minimum in-stream flow requirements for migrating adults in the Electron Dam project area. Under the REA, PSE will provide 60 cfs year-round in the bypass reach. This will increase to 80 cfs during the four month period from July 15-November 15 to facilitate adult salmon migrating upstream.

(WDFW et al. 2000)

3.3) Relationship to harvest objectives.

"The co-managers agree harvest management should be biased toward maximum harvest of hatchery origin fall chinook, while naturally produced fall chinook should be harvested at a rate that is consistent with maintaining or improving natural stock productivity. To accomplish this the co-managers will consider fishery opportunities and gear types that accommodate differential harvest rates on the hatchery and natural fall chinook stocks" (WDFW et al. 2000).

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

"Limited tag recovery information indicates that Puyallup River hatchery fall chinook historically contributed to most Washington and southern B.C. mixed stock chinook fisheries, the Puget Sound recreational fishery and the Puget Sound terminal net fisheries" (WDFW et al. 2000).

See Attachment 6. & 7. For historical recreational and tribal catches respectively.

Summary of Predicted Puyallup River Fall Chinook Exploitation Rates by Aggregated Fisheries see Attachment 8.

3.4) Relationship to habitat protection and recovery strategies.

A number of anthropogenic factors have affected fish habitat throughout the Puyallup Basin. Beginning in the late 1800's timber production began resulting bank stability problems and increased sediment loads. Habitat has also been affected by flood control activities, which have included removal of riparian vegetation, removal of large woody debris from the river channel, levee construction, gravel removal and channelization. Remedies are currently under way to mitigate some past land management practices. Land acquisitions for the construction of set-back is one such practice. The increase sinuosity created by the use the setback levies should aid in gravel and woody debris recruitment processes creating more suitable spawning habitat for adults and more refugia for rearing and outmigrating juveniles.

"The lower Puyallup River, below its confluence with the White River, and Commencement Bay estuary has both been heavily impacted by residential and commercial development. Commencement Bay has been heavily influenced by industrial uses. In 1982, the federal government ranked the Commencement Bay amongst the most hazardous waste sites in the U.S.. Restoration efforts are currently underway which are managed by the Natural Resource Damage Trustees. The trustees include NOAA, USFWS, DOE, DNR, WDFW, and the Puyallup and Muckleshoot Indian Tribes (WDFW et al. 2000).

The upper Puyallup Basin has been void of anadromous fish production since the construction of the Electron Dam in 1903. Under the Resource Enhancement Agreement the Puyallup Tribe and Puget Sound Energy have been working together to construct a fish ladder. The fish ladder became operational in August 2000.

3.5) Ecological interactions.

Hatchery fish can interact with listed fish species through competition and predation (Fresh 1997). Program fish can negatively impact listed fish populations through reduced growth, survival and abundance. Several methods have been developed to assess potential negative ecological interactions and risks associated with hatchery programs (Pearsons and Hopley 1999; Ham and Pearsons 2001). The degree to which fish interact depends upon fish life-history characteristics which include: 1) size and morphology, 2) behavior, 3) habitat use and 4) movements (Flagg et al. 2000). Important considerations associated with hatchery practices include the type of species reared, fish size at time of release, number of fish released and location(s) of program releases. Interaction potential between hatchery origin fish and natural origin fish can certainly depend on habitat structure and system productivity. For example, habitat structure can influence predator-prey encounter rates (visibility), the amount of preferred spawning habitat and fish susceptibility to flushing flows. System productivity determines the degree to which fish populations may be food-limited, and thus negatively impacted by density-dependent effects. The type and degree of risk associated with releases of program fish typically involve complex mechanisms. Actual identification and magnitude of causal mechanisms negatively impacting listed fish is not always definitive due to confounding factors such as human-induced environmental changes, indirect pathway effects and the diversity of environments salmon occupy throughout their life-cycle (Li et al. 1987; Fausch 1988; Fresh 1997; Flagg et al. 2000). Given these complex mechanisms and site-specific considerations it is not surprising that for most hatchery programs, the extent of possible adverse competition and predation effects of hatchery releases on listed fish populations throughout Puget Sound have not been explicitly documented or quantified.

Given the perceived risks associated with hatchery programs, hatchery coho salmon are reared and released in a manner to minimize potential negative impacts on listed chinook salmon and bull trout populations (see Section 10.11).

Releases of yearling coho salmon certainly pose a predation risk on juvenile fall chinook and chum salmon, both in the freshwater and marine environment (Hargreaves and LeBrasseur 1985; Hawkins and Tipping 1999; Pearsons and Fritts 1999). Actual rates of predation by program releases of yearling coho salmon on juvenile chinook and chum salmon are unknown at this time.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Water is surface water that is gravity fed to the acclimation ponds.

Department of Ecology permit for water withdrawal is G2-25820.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

4.3)

All intakes are designed to be non lethal to fish.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock for this program are collected at Voights Creek Hatchery (See Voights Creek HGMP).

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Fish transportation equipment consists of three 600-gallon capacity tanks each is supplied with supplemental oxygen and aeration. (Blake Smith pers. comm.)

5.3) Broodstock holding and spawning facilities.

See Voights Creek HGMP.

5.4) Incubation facilities.

Incubation occurs at Voights Creek Hatchery.

Rearing facilities.

Initial rearing occurs at Voights Creek Hatchery.

5.5) Acclimation/release facilities.

The Coho Acclimation Program typically receives 200k yearlings received from Voights Creek's egg take. All 200k are released from acclimation sites above Electron Dam.

5.6) Describe operational difficulties or disasters that led to significant fish mortality.

Water flows to the raceways at Voight Creek Hatchery interrupted when gravity intake became plugged killing 100,000 coho yearlings in the Spring of 1999.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Hatchery has a low water alarm installed, linked via pager to hatchery staff. Also installed on-site is a back-up diesel powered generator capable of supplying a 170 kW in the event of an electrical failure.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Reference Voights Creek HGMP for this information. No broodstock is collected on-station.

6.2) Supporting information.

6.2.1) History.
6.2.2) Annual size.
6.2.3) Past and proposed level of natural fish in broodstock.
6.2.4) Genetic or ecological differences.
6.2.5) Reasons for choosing.

See Voights Creek HGMP

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

See Voights Creek HGMP

SECTION 7. BROODSTOCK COLLECTION

Broodstock are collected at Voights Creek Hatchery (See Voights Creek HGMP)

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Not applicable

7.2) Collection or sampling design.

Not applicable

7.3) Identity.

Voights Creek Stock

7.4) Proposed number to be collected:

Not applicable

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Not applicable

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Not applicable

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Not applicable

7.6) Fish transportation and holding methods.

Not applicable

7.7) Describe fish health maintenance and sanitation procedures applied.

Not applicable

7.8) Disposition of carcasses.

Not applicable

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Not applicable

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

Matings occur at Voights Creek hatchery see Voights Creek fall chinook HGMP for specific mating protocols.

8.1) Selection method.

Not applicable

8.2) Males.

Not applicable

8.3) Fertilization.

Not applicable

8.4) Cryopreserved gametes.

Not applicable

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

Not applicable

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Voights Creek Hatchery HGMP

9.1.2) Cause for, and disposition of surplus egg takes.

No excess eggs available

9.1.3) Loading densities applied during incubation.

See Voights Creek HGMP

9.1.4) Incubation conditions.

9.1.5) Ponding.

9.1.6) Fish health maintenance and monitoring.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Not applicable, hatchery stock is not listed.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..

Survival data on hatchery fish is available and is calculated from stage received at facility through time of release. Fish are received at yearling stage and released when smolting.

Brood Year	% Survival	Stage Received	Comments
1996	89.2	Yearling	WDFW overloaded transfer truck
1997	99.9	Yearling	
1998	50.7	Yearling	Plugged intake at Voight Creek Hatchery

9.2.2) Density and loading criteria (goals and actual levels).

Include density targets (lbs fish/gpm, lbs fish/ft3 rearing volume, etc).

Rearing densities dependent on fish size

Fall Coho
Cowskull Pond

Date	# of Fish	#/pound	lbs/cu ft	lbs/gpm	Length	C.F.	Flow
06-Feb-98	90,000	32	0.27	4.19			672gpm
09-Apr-98	90,000	22	0.39	6.09			672gpm

Fall Coho

Date	# of Fish	Rearing Location	Rearing Capacity	Flow	Fish/pound	Lbs/gpm	Lbs/cu. ft.	temp	Biomass
27-Jan-99	**50,000**	**Mowich**	**7,500**	**151**	**37**	**8.94**	**0.18**	**39**	**1,351**
27-Jan-99	**150,000**	**Rushingwater**	**12,000**	**2050**	**37**	**1.98**	**0.33**	**40**	**4,054**
22-Apr-99	**49,850**	**Mowich**	**7,500**	**150**	**28**	**11.8**	**0.23**	**42**	**1,780**
25-May-99	**149,970**	**Rushingwater**	**12,000**	**2050**	**22**	**3.33**	**0.57**	**42**	**6,817**

Fall Coho
Rushingwater Pond

Date	# of Fish	#/pound	Lbs/cu. ft.	Lbs/gpm	flow	temp
26-Jan-00	105,000	32	0.27	1.60	2050gpm	36
10-Mar-00	104,500	32	0.27	1.60	2050	36
08-May-00	104,400	23.6	0.37	2.16	2050	42
19-May-00	101,400	22.3	0.38	2.22	2050	44

500-1000 fpp .5 lb/ft^3/in, 2 lbs/gpm (maximum threshold)

17-500 fpp .5 lb/ft^3/in, 6 lbs/gpm (maximum threshold)

9.2.3) Fish rearing conditions

Description of acclimation ponds

Unit	Cubic Feet	Flow *	Exchange/HR
Mowich	14,000	1300 gpm	.74
Cow Skull	10,000	896 gpm	.72
Rushingwater	12,000	2050	1.4

*= Average flow
Acclimation pond temperatures range from 39-54 F
DO approximately12 ppm

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

See Attachment 10.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Data not available

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Acclimation ponds
Feeding is achieved by automatic AF3A Sweeny scatter feeders with 6 separate feeding intervals between 1 to 2 percent body weight per day of Biodry 1000 based on temperature and size of fish.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Each year, fish pathologists screen a representative number of adults returning to tribal hatcheries for pathogens that may be transmitted to the progeny. The exact number of fish to be tested from each stock is specified in the Co-managers Salmonid Control Policy. Pathologists work with hatchery crews to help avoid pre-spawning mortality of broodfish to maximize fertilization and egg survival.

Preventative care is also promoted through routine juvenile fish health monitoring. Pathologists conduct fish health exams at each of the tribal hatcheries on a monthly basis from the time juveniles' swim-up until they are released as smolts. Monthly monitoring exams include an evaluation of rearing conditions as well as lethal sampling of small numbers of juvenile fish to assess the health status of the population and to detect pathogens of concern. Results are reported to hatchery managers along with any recommendations for improving or maintaining fish health. Vaccine produced by the TFHP may be used when appropriate to prevent the onset of two bacterial diseases (vibriosis or enteric redmouth disease). In the event of disease epizootics or elevated mortality in a stock, fish pathologists are available to diagnose problems and provide treatment recommendations. Pathologists work with hatchery crews to ensure the proper use of drugs and chemicals for treatment. The entire health history for each hatchery stock is maintained in a relational database called AquaDoc. (Northwest Indian Fisheries Commission Fish Pathology pers.comm.)

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Not applicable

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Both acclimation ponds have natural rock bottoms with root wads placed in the ponds.

9.2.10) **Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.**

Fish will be reared to sub-yearling smolt size to mimic the natural fish emigration strategy and are released volitionally.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	200,000	28-18 fpp	Late April-Mid May	Acclimation

10.2) Specific location(s) of proposed release(s).
Stream, river, or watercourse:
Release point:
Major watershed:
Basin or Region:

See Attachment 11.

10.3) Actual numbers and sizes of fish released by age class through the program.

See Attachment 11.
http://www.nwifc.wa.gov/CRAS.asp

10.4) Actual dates of release and description of release protocols.

Acclimation pond fish are released volitionally.

See Attachment 11. for specific release date ranges.

10.5) Fish transportation procedures, if applicable.

Fish are transported via oxygen supplemented tanker truck, container volumes for each of the three tanks is 600 gallons. The transit time to the acclimation sites is about 1 hour.

10.6) **Acclimation procedures.**

Fish are transported in late January to acclimation sites and are acclimated for approximately 4 months.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Hatchery population is 50% CWT and 100% adipose fin clipped for acclimation pond releases.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Not applicable

10.9) Fish health certification procedures applied pre-release.

Fish health is monitored monthly by Northwest Indian Fisheries Commission Fish Health Staff.

10.10) Emergency release procedures in response to flooding or water system failure.

In the event of catastrophic water failure fish would be released early. (Blake Smith, pers. comm.)

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Given the perceived risks associated with hatchery programs (see Section 3.5), hatchery coho salmon are reared and released in a manner to minimize potential negative impacts on listed chinook salmon and bull trout populations. These measures include:

Coho smolts are released at smoltification to promote rapid outmigration in the freshwater and nearshore marine environment.

Acclimation pond rearing is aimed at mimicking characteristics of 'wild juvenile fish.

Voights Creek Hatchery has reduced coho smolt releases by 400,000 fish.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

Monitoring and evaluation plan is currently being developed

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Coho smolts are marked with ad/cwt determine survival rates of the program and compare them with cwt coho smolts released from Voights Creek Hatchery

12.2) **Cooperating and funding agencies**.

Puyallup Tribe of Indians and WDFW. Program funded by the Puyallup Tribe.

12.3) Principle investigator or project supervisor and staff.

Principle investigators: Blake E. Smith, Enhancement Chief; Russell C. Ladley, Environmental Protection Manager.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

Adults ascending Electron Dam will be trapped in the fish ladder and visually sampled for external marks. A cwt wand will be used to detect cwt presence. Spawning ground surveys in tributaries below the dam and above will be sampled for marked coho adults. All tribal fisheries will be marked sampled.

12.6) Dates or time period in which research activity occurs.
Adult coho are recovered in all sampled fisheries and on the spawning grounds.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.
N/A

12.8) Expected type and effects of take and potential for injury or mortality.
No take is occurring to listed species during sampling.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).
Zero**.**

12.10) Alternative methods to achieve project objectives.
None.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.
Coho: At time of tagging, and transportation to acclimation ponds. Mortality is less than 1%.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.
No adverse ecological effects, injury, or mortality to listed fish will occur during this research activity except as mentioned under Section 3.5

SECTION 13. ATTACHMENTS AND CITATIONS

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Li HW, Schreck CB, Bond CE, Rexstad E. 1987. Factors influencing changes in fish assemblages of Pacific Northwest streams. In: Matthews WJ, Heins DC, editors. Community and Evolutionary Ecology of North American Fishes: University of Oklahoma Press, Norman and London. p 193-202.

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Pacific International Engineering. PuyallupTribe Beach Seine Data 1980-1995. Pacific International Engineering, PLLC, 151 S. Worthen Strret, Suite 101, Wenatchee, WA. 98801, November 10, 1998.

Pearsons TN, Fritts AL. 1999. Maximum size of chinook salmon consumed by juvenile coho salmon. North American Journal of Fisheries Management 19:165-170.

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Washington Department of Fish and Wildlife, Muckleshoot Tribe of Indians, and the Puyallup Tribe of Indians. 2000. The Puyallup River Fall Chinook Recovery Plan. Contact: Chuck Baranski, WDFW Fish Program Region 6

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: _____ ESU/Population:_____ Activity:_____				
Location of hatchery activity:_____ Dates of activity:_____ Hatchery program operator:_____				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.

g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.